

# Flight Attendant Work/Rest Patterns, Alertness, and Performance Assessment: A Field Study

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# Study Goals

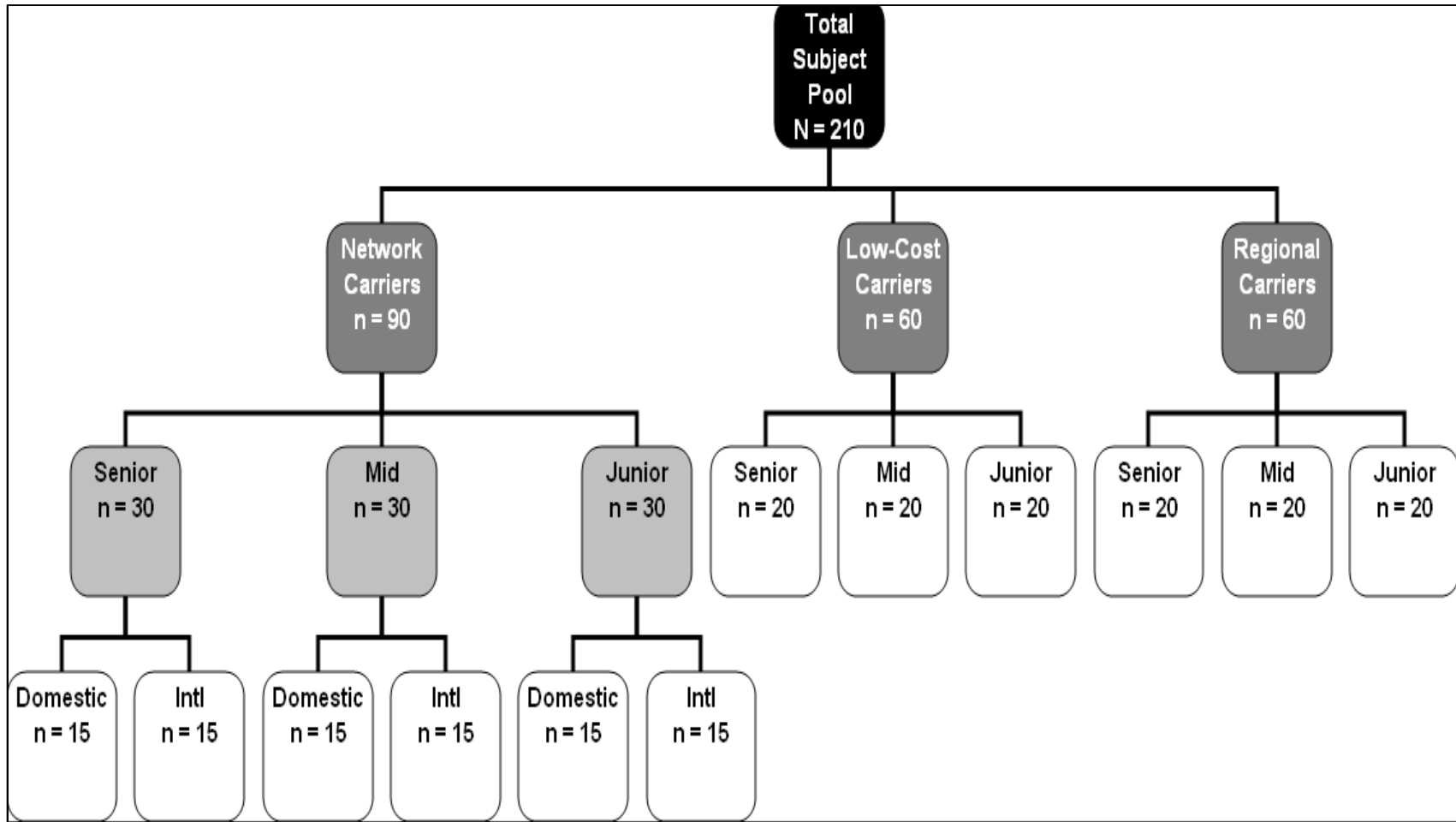
- How much activity, rest, and sleep do US-based flight attendants engage in during a typical 3-4 week period?
- Do these patterns affect attention, subjective sleepiness, and mood?
- Do these effects vary as a function of carrier type, seniority status, or domesticity?



# Part II: Field Study

- Field study requires most complex data collection
  - Sole source of objective data on sleep/wake patterns, cognitive performance, mood changes, and workload patterns of flight attendants as they progress through a normal duty & off-duty monthly work cycle
- CAMI initiated cooperative research agreement with nonprofit research organization (IBR) with field research experience to conduct the project
- CAMI worked extensively with airlines and flight attendant unions in protocol development and volunteer recruitment strategies

# Field Study Design



# Recruitment & Selection

- Announcement letter released in cooperation with airlines and union reps
- Volunteers directed to online eligibility survey
- ***5,000 applicants***



# Recruitment & Selection

- Reduced to ~3,000 eligible volunteers
- Random selection of N+10 per group
- Statistically compared to respective applicant pool for age and gender ratio
- Randomly assigned as Primary or Backup participant and notified via email



# Scheduling

- Excel database, but based on individual communication and manual scheduling & tracking
- Coordinate launch, consent, shipping, training
- Improvisation in response to AWOL, vacations, dropouts, missed shipments, and other schedule changes



# Data Collection: Background Questionnaire

- SurveyMonkey.com
  - Included demographics, NASA TLX weighting questions, Morningness-Eveningness questionnaire
  - SurveyMonkey affordable and easy to use
  - Automatic results, summaries, and graphs
  - Downloadable full results in Excel



# Sleep & Activity Monitoring

- Pedometer (duty only)
- 24-hr/day Actigraphy



SleepBand ([www.fatiguescience.com](http://www.fatiguescience.com))

- Non-invasive
- Non-interactive
- Waterproof
- Experimenter controlled via IR-USB

# Personal Digital Assistant (PDA)



- AT&T Tilt, Mobile Testing Suite (software developed by Peter Wubbels; [www.archinoetics.com](http://www.archinoetics.com))
- Data downloaded via cell network following each testing session

# PDA Daily Activity Log

Start 10:20

**Run Mobile Testing Suite**

Time Since Last Log Edit: **0d 00:01**

Current State: **At Work**

*Local Time is...*

**Monday, Mar 02**

**10:20:41**

Home Time: Monday, Mar 02, 10:20

**Radio Off** **Device Lock**

Schedule Log ok

**Event Manager**

New Save Cancel Del

**Event Type**  
No Work, At Home

**Location**  
ADL,10.5

**Start Time**  
06:55 03/03/09

**Notes**

**Event Key**

Sleep	Work Break
Nap	Commute
At Work	No Work: Home
In-Flight	No Work: Away

Tuesday Mar 03, 09 06:56

# Objective Performance Measures

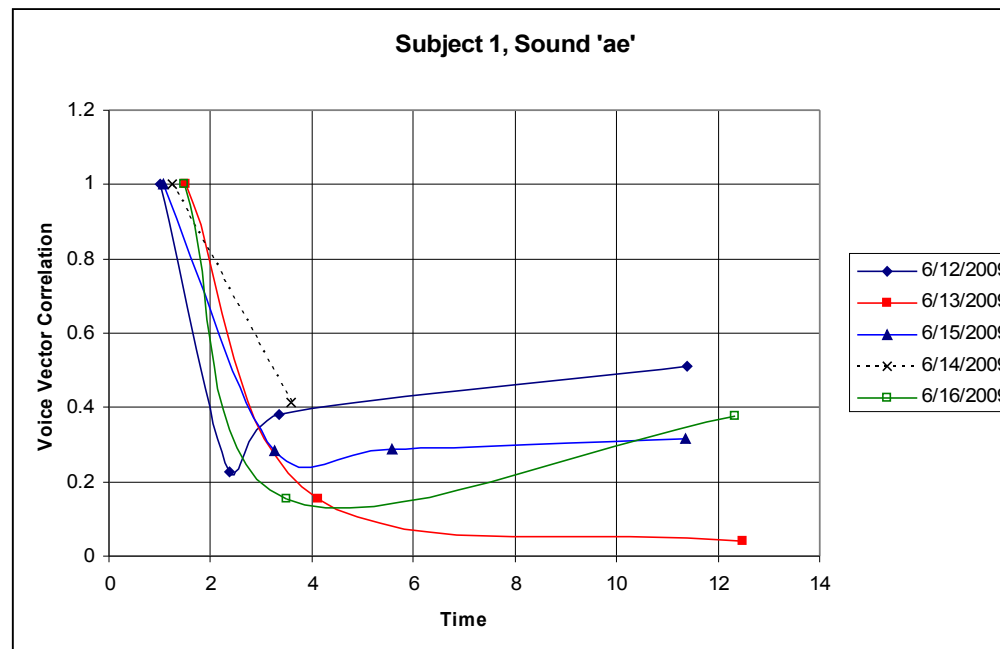


- PDA Touchscreen-Based 5-min Psychomotor Vigilance Test (PVT)
- Participants responded with a screen touch when numerals appear
- Display of response time (42 ms in example) provided for each response
- Time between stimuli varied from 3-10 sec

# Objective Performance Measures

## Voice Recordings

- 5 randomly ordered fatigue-sensitive phrases designed and analyzed by Dr. Hal Greeley of Response Applications, LLC (hpg@responseapplications.com)



# Subjective Reports

- Visual Analogue Scale (VAS)
  - Subjective fatigue and mood
  - NASA TLX (post-work)
  - Sleep Quality (post-sleep)

The screenshot shows a software window titled "MPT Suite". Inside, there is a light blue header bar. Below it, a text box contains the instruction: "Please click on the line below to describe your most recent work period." This is followed by the question: "How mentally demanding was the task (this past work period)?". Below the question is a horizontal black line representing the scale. A red vertical line with a dot at the top is positioned near the right end of the scale. The left end of the scale is labeled "Very Low" and the right end is labeled "Very High". Below the scale is a blue button with the text "OK". At the bottom of the window, there is a blue bar with the words "Back" and "Forward" separated by a keyboard icon.

# Subjective Effects

- Additional Tests
  - Drug Use Questionnaire (pre-sleep)
    - ✓ Select all that apply
  - Post-Duty Questionnaire
    - ✓ How often did ... happen?

# Data Management

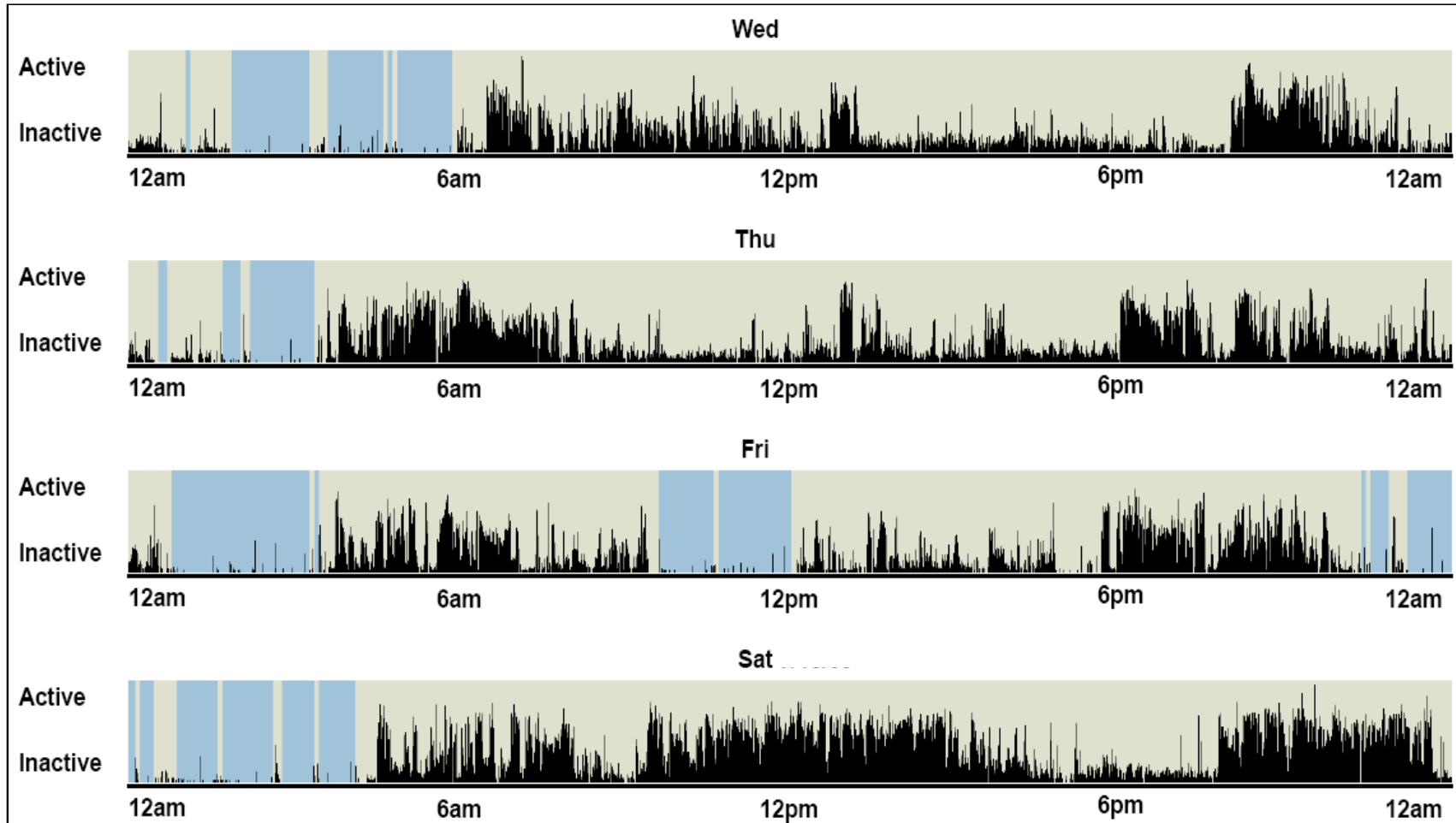
- On-call availability for real-time assistance to participants in the field
- All PDA data uploaded to secure FTP site via cellular network after every test session
  - ✓ Check compliance of daily log and testing
- All actigraphy and PDA data stored on internal memory for final extraction and compilation upon equipment return
  - ✓ Final package for each subject uploaded to secure MediaFire account ([www.mediafire.com](http://www.mediafire.com))



# Data Analysis

- All PDA data converted to Excel-compatible format
  - Traditional database techniques and conventional statistical analyses
- Raw Actigraphy data processed through proprietary algorithm to generate sleep and wake amounts, sleep efficiency, etc

# Actigraphy Output Example Of 4 Days



# Lessons Learned?

- Ample use of cost-effective online and off-the-shelf computer resources for recruitment, demography, and data management
- Actigraphy and PDA devices provide flexibility and convenience in operational settings

# Current Status of Field Study

- Participant solicitation began Feb-Mar 09
  - 5,000 interested FAs contacted Web site
  - 3,600 completed Pre-Study Questionnaire
- So far, data collected from 156 Flight Attendants between 5/25/09 and 3/10/10
- Data collection continues through Spring 2010

# Questions?

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